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Lee

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(54) **SAFETY UNIT OF HINGE FOR FOLDING LADDER**

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E05D 15/50 (2006.01)

(52) **U.S. Cl.** **16/231**; 16/377; 403/62; 403/68; 403/23; 182/163; 182/22; 182/24

(58) **Field of Classification Search** 16/231, 16/250, 251, 268, 355, 377, 387, 388; 182/163, 182/22–26, 156; 403/62, 96, 68, 93, 23, 403/12
See application file for complete search history.

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(57) **ABSTRACT**

Disclosed herein is a safety unit of a hinge for a folding ladder to prevent a user's finger from being caught in the hinge when the hinge rotates. The hinge includes a first joint unit, a second joint unit, and a locking unit, and the safety unit is provided between a first stop shoulder of the first joint unit and a second stop shoulder of the second joint unit. The safety unit includes a mount part and an insert part. The mount part is provided in the first joint unit to be positioned under the first stop shoulder, and an inside portion of the mount part is rounded to surround a part of the first joint unit. The insert part extends from an upper end of the mount part, and is rounded to have the same curvature as the inside portion of the mount part. When the second joint unit rotates relative to the first joint unit, the insert part is inserted into the second stop shoulder, Further, an insert blade is inwardly projected from horizontal center lines of inside portions of both the mount part and the insert part, and is circumferentially inserted into an outer circumferential surface of the first joint unit.

1 Claim, 4 Drawing Sheets

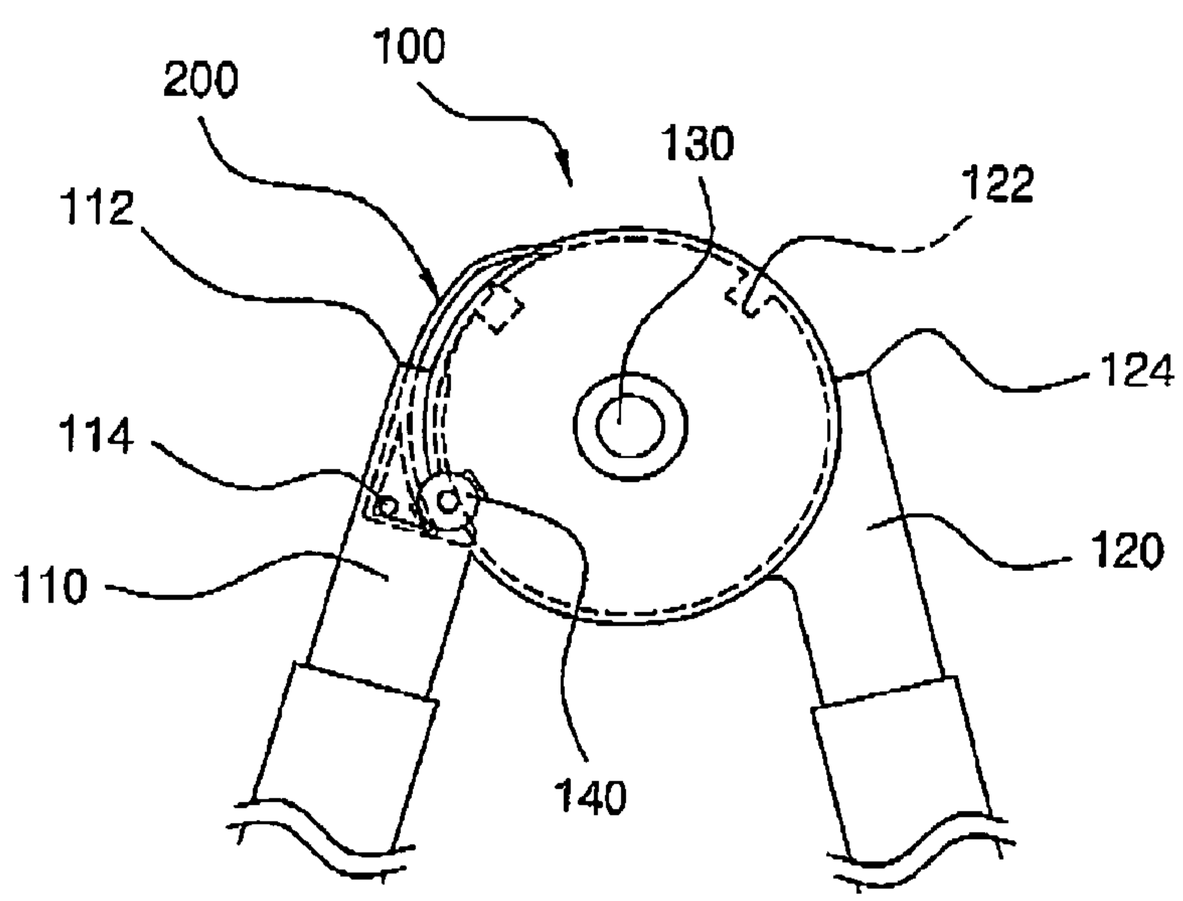
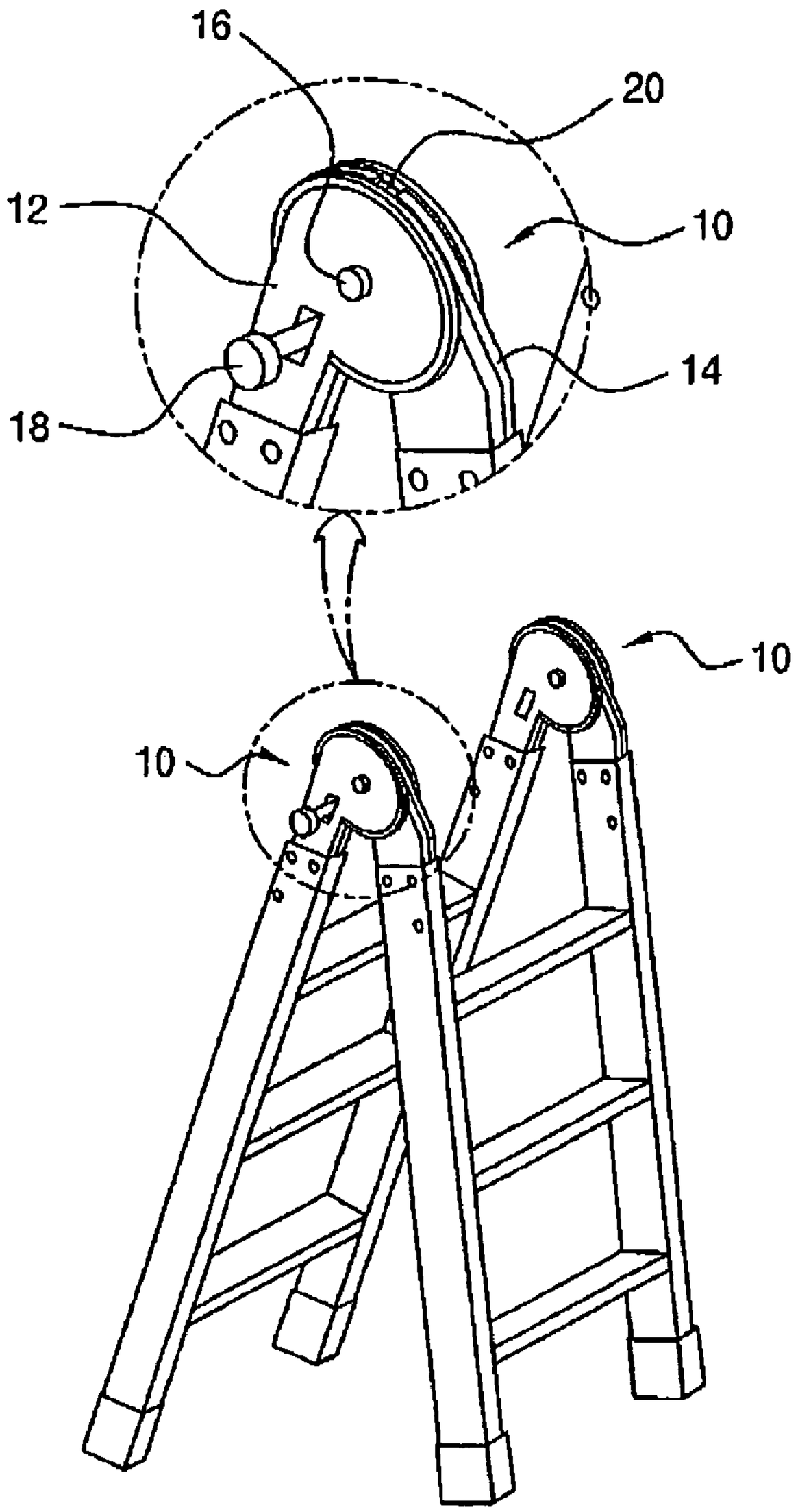
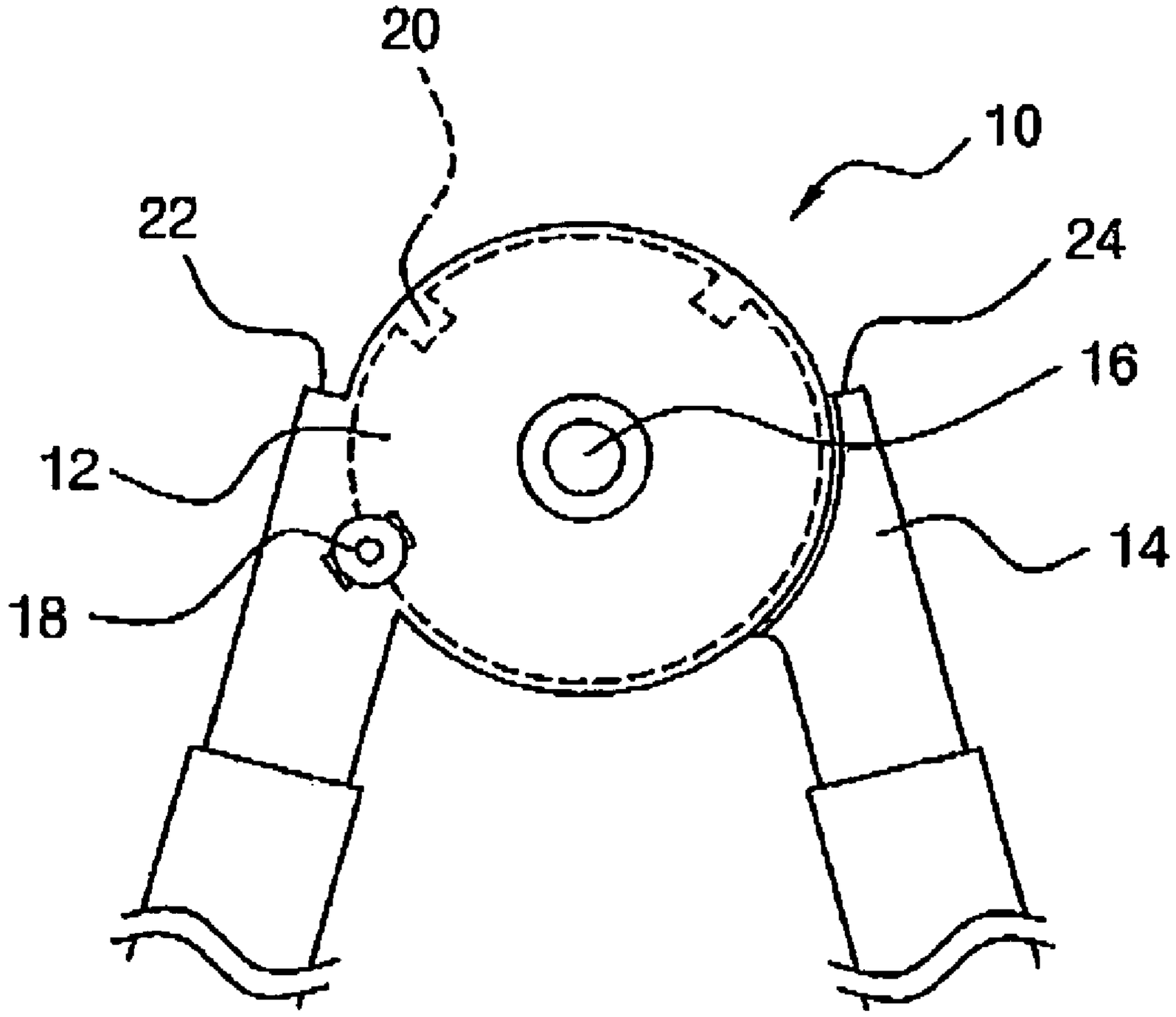


Fig.1



PRIOR ART

Fig.2



PRIOR ART

Fig.3

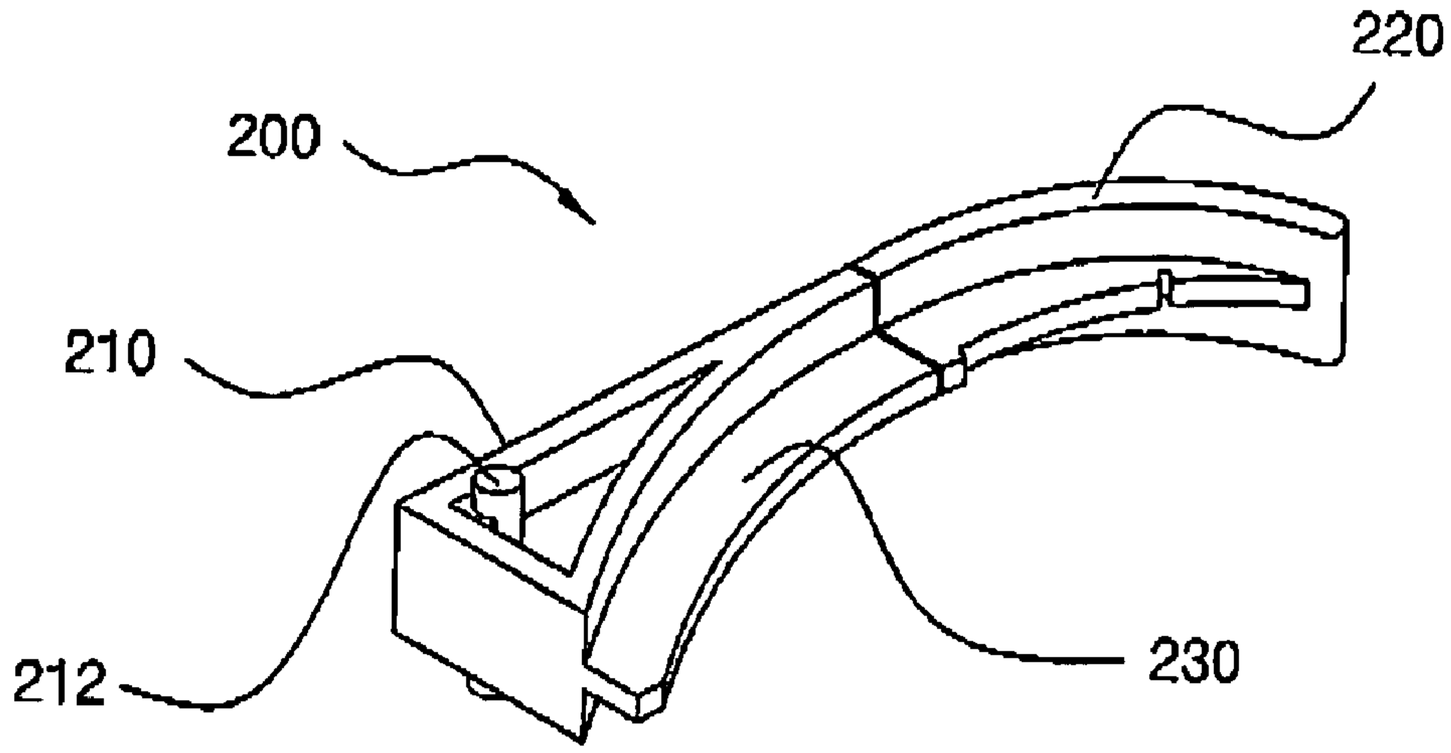


Fig.4

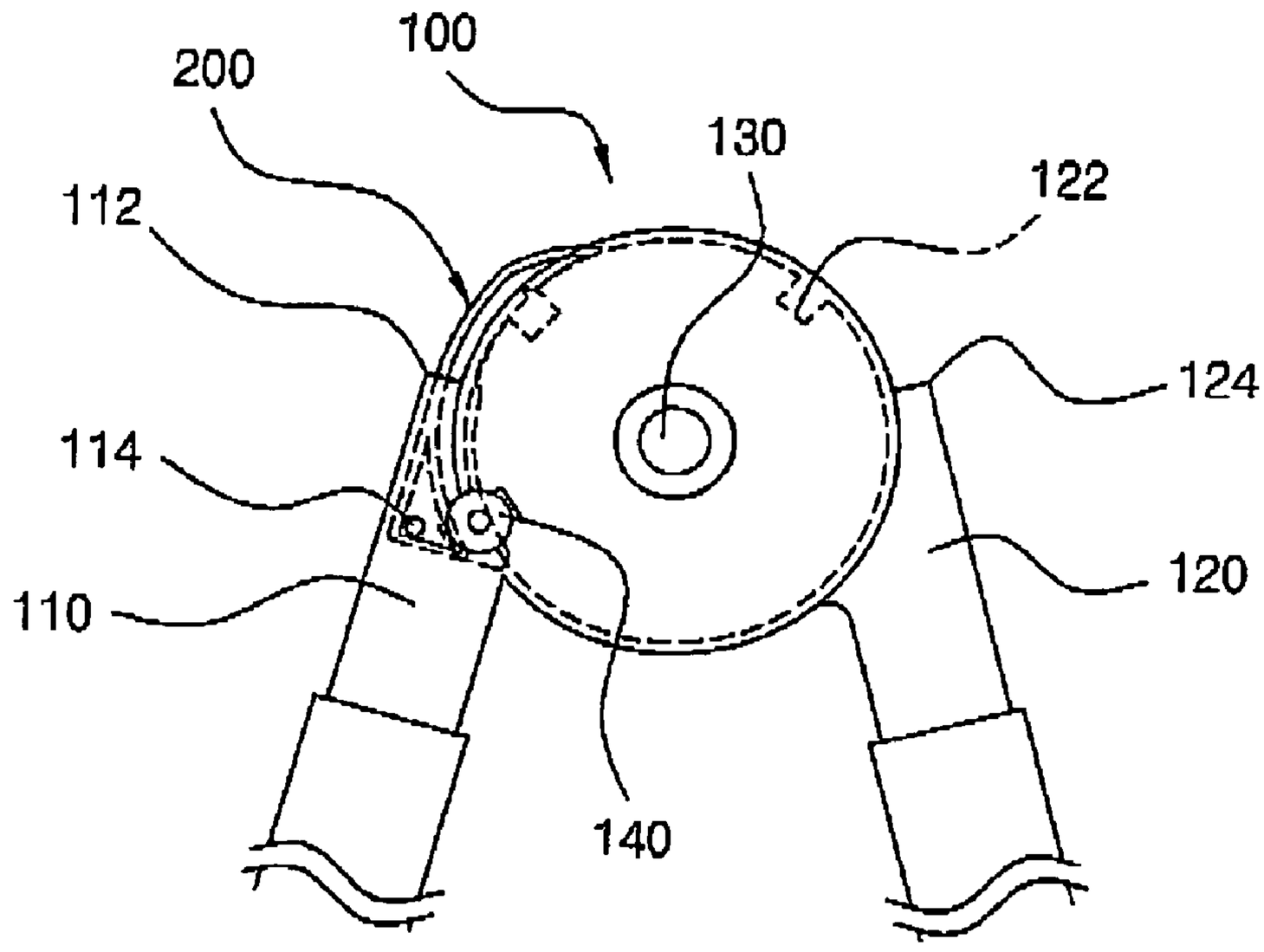
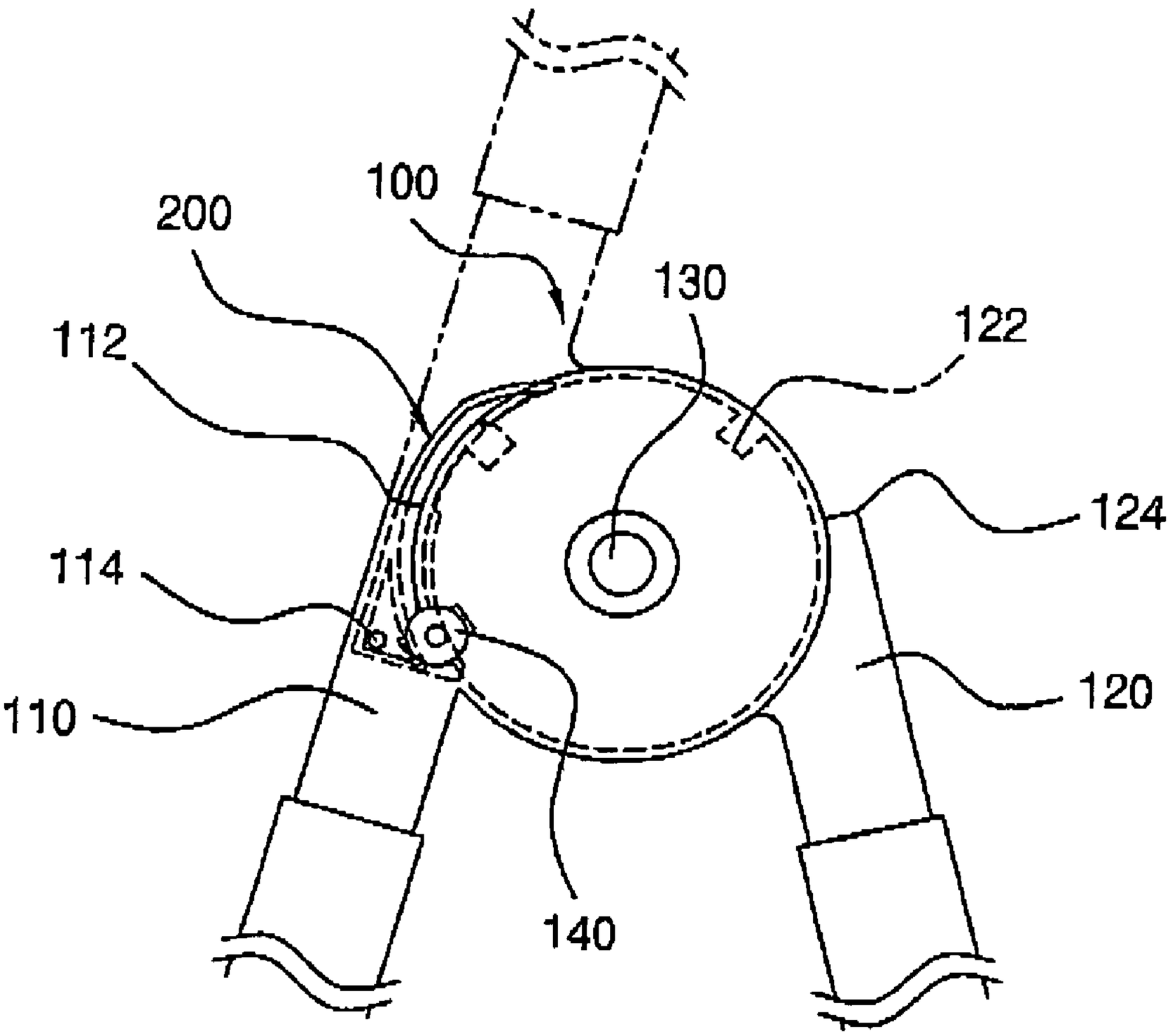


Fig.5



SAFETY UNIT OF HINGE FOR FOLDING LADDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to hinges for folding ladders, and more particularly, to a safety unit of a hinge for a folding ladder, which prevents a user's finger from being undesirably caught in the hinge when the hinge rotates.

2. Description of the Related Art

Generally, a ladder comprises a rod- or tube-shaped frame which is made of metal. Since the ladder is large in volume, the ladder is manufactured to be foldable. FIGS. **1** and **2** show conventional hinges for folding ladders. As shown in FIG. **1**, the hinge **10** includes a first joint unit **12** having a pair of discs, a second joint unit **14** having one disc, a locking unit **18**, and a guide disc (not shown). The first and second joint units **12** and **14** are coupled to each other by a central shaft **16**, and pivot on the central shaft **16** while rotating relative to each other. The guide disc is provided between the discs of the first joint unit **12** to be operated in cooperation with the second joint unit **14**. Thus, according to a position of the guide disc, the locking unit **18** provided at a predetermined portion of the first joint unit **12** engage with one of notches **20** provided along a peripheral edge of the disc of the second joint unit **14**, so that the first and second joint units **12** and **14** are locked at a desired angular position.

However, when a strong impact acts on the hinge **10** in a state where the hinge **10** is angled at 180°, the hinge **10** may be undesirably folded or a load may be concentrated on the central shaft **16**, thus causing deformation of the central shaft **16** and thereby leading to a malfunction of the hinge **10**.

In order to solve this problem, as shown in FIG. **2**, the first and second joint units **12** and **14** have first and second stop shoulders **22** and **24**, respectively, thus preventing the hinge **10** from further rotating when the first and second joint units **12** and **14** are angled at 180°.

However, such a hinge **10** has a problem in that a user's finger may be caught between the first and second stop shoulders **22** and **24**, when the second joint unit **14** rotates relative to the first joint unit **12** and the first and second stop shoulders **22** and **24** come into contact with each other.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a safety unit for a hinge of a folding ladder, which is provided between a first stop shoulder of a first joint unit and a second stop shoulder of a second joint unit, thus preventing a user from being injured when the first and second stop shoulders come into contact with each other.

In order to accomplish the above object, the present invention provides a safety unit of a hinge for a folding ladder. In this case, the hinge includes a first joint unit, a second joint unit, a guide disc, and a locking unit. The first joint unit has at a predetermined position thereof a first stop shoulder. The second joint unit is coupled to the first joint unit by a central shaft so that the first and second joint units pivot on the central shaft while rotating relative to each other. A second stop shoulder is provided at a predetermined position of the second joint unit to be opposite to the first stop shoulder. The guide disc is provided in the first joint unit to be operated in cooperation with the second joint unit. The locking unit is provided at a predetermined position of the first joint unit, and engages with one of notches provided along a peripheral edge of the second joint unit so that the first and second joint units are locked at a desired angular position. The safety unit is provided between the first and second stop shoulders, and includes a mount part, an insert part, and an insert blade. The mount part is fastened to a predetermined portion of the first joint unit to be positioned under the first stop shoulder. An inside portion of the mount part is rounded to surround a part of the first joint unit. The insert part integrally extends from an upper end of the mount part, and is rounded to have a same curvature as the inside portion of the mount part. The insert part is inserted into the second stop shoulder when the second joint unit rotates relative to the first joint unit. The insert blade is inwardly projected from horizontal center lines of inside portions of both the mount part and the insert part, and is circumferentially inserted into an outer circumferential surface of the first joint unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIGS. **1** and **2** are views to show conventional hinges for folding ladders;

FIG. **3** is a perspective view of a safety unit, according to an embodiment of the present invention;

FIG. **4** is a side view of a hinge for a folding ladder having the safety unit of FIG. **3**; and

FIG. **5** is a view to show an operation of the hinge of FIG. **4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, embodiments of the present invention will be described in detail with reference to the attached drawings.

Reference now should be made to the drawings, in which the same reference numerals are used throughout the different drawings to designate the same or similar components.

FIG. **3** is a perspective view of a safety unit, according to an embodiment of the present invention, and FIG. **4** is a side view of a hinge for a folding ladder having the safety unit of FIG. **3**.

Referring to FIGS. **3** and **4**, a hinge **100** according to this invention includes a first joint unit **110** having a pair of discs, and a second joint unit **120** having a disc. The first and second joint units **110** and **120** are coupled to each other by a central shaft **130**, and pivot on the central shaft **130** while rotating relative to each other. A guide disc is provided between the discs of the first joint unit **110** to be operated in cooperation with the second joint unit **120**. Further, a locking unit **140** is provided at a predetermined portion of the first joint unit **110**, and engages with one of notches **122** provided along a peripheral edge of the disc of the second joint unit **120**, so that the first and second joint units **110** and **120** are locked at a desired angular position. Further, according to the present invention, the hinge **100** includes a safety unit **200**.

Further, a first stop shoulder **112** is provided at a predetermined position of the first joint unit **110**, and a second stop shoulder **124** is provided at a predetermined position of the second joint unit **120** to be opposite to the first stop shoulder

112. Thus, when the first and second joint units **110** and **120** are angled at 180°, the first and second stop shoulders **112** and **124** come into contact with each other. Further, a mount hole **114** is provided at a predetermined portion of the first joint unit **110** to be placed under the first stop shoulder **112**.

The safety unit **200** is disposed between the first and second stop shoulders **112** and **124**. As shown in FIG. **3**, the safety unit **200** includes a mount part **210** and an insert part **220**. The mount part **210** is fastened to the first joint unit **110** to be positioned under the first stop shoulder **112**. A mount rod **212** is provided at a predetermined position of the mount part **210** to be projected outward, so that the mount rod **212** is fitted into the mount hole **114** of the first joint unit **110**. In this case, an inside portion of the mount part **210** is rounded to surround a part of outer circumferential surfaces of the discs of the first joint unit **110**.

Further, the insert part **220** has a shape of a plate, and integrally extends from an upper end of the mount part **210** to be curved at the same curvature as the inside portion of the mount part **210**. An insert blade **230** is inwardly projected from horizontal center lines of inside portions of both the mount part **210** and the insert part **220**. The insert blade **230** is circumferentially inserted between the outer circumferential surfaces of the discs of the first joint unit **110** to allow the safety unit **200** to be in more close contact with the first joint unit **110**.

The use of the hinge **100** constructed as described above will be described in brief in the following.

FIG. **5** is a view to show the operation of the hinge **100** for the folding ladder, according to the present invention.

Referring to FIG. **5**, when a user desires to keep the folding ladder in a place, the first and second joint units **110** and **120** are closed so that inside portions of the first and second joint units **110** and **120** come into contact with each other. In this case, the volume of the folding ladder is minimized, thus it is easier to keep the folding ladder in a place. Meanwhile, when the user desires to use the folding ladder, the locking unit **140** is pressed to be unlatched. When the locking unit **140** is unlatched, the first and second joint units **110** and **120** pivot on the central axis **130** to adjust the angle between the first and second joint units **110** and **120**, as desired. In a detailed description, the plurality of notches **122** are provided along the peripheral edge of the disc of the second joint unit **120**. Thus, while the second joint unit **120** rotates relative to the first joint unit **110**, the locking unit **140** of the first joint unit **110** engage with one of the notches **122**, so that the folding ladder is locked at a desired angular position. Meanwhile, when the first and second joint units **110** and **120** are angled at 180°, the first stop shoulder **112** of the first joint unit **110** comes into contact with the second stop shoulder **124** of the second joint unit **120**. At this time, the insert part **220** of the safety unit **200** is inserted into the second stop shoulder **124**, thus preventing an object from being caught between the first and second stop shoulders **112** and **124**.

As described above, the present invention provides a safety unit of a hinge for a folding ladder, which closes a space between a first stop shoulder of a first joint unit and a second stop shoulder of a second joint unit when the hinge rotates, thus preventing a user's finger from being caught between the first and second stop shoulders.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the

What is claimed is:

1. A safety unit of a hinge for a folding ladder, the hinge comprising: a first joint unit having at a predetermined position thereof a first stop shoulder; a second joint unit coupled to the first joint unit by a central shaft so that the first and second joint units pivot on the central shaft while rotating relative to each other, with a second stop shoulder being provided at a predetermined position of the second joint unit to be opposite to the first stop shoulder; a guide disc provided in the first joint unit to be operated in cooperation with the second joint unit; and a locking unit provided at a predetermined position of the first joint unit, the locking unit engaging with one of notches provided along a peripheral edge of the second joint unit so that the first and second joint units are locked at a desired angular position, the safety unit being provided between the first and second stop shoulders, and comprising:

a mount part fastened to a predetermined portion of the first joint unit to be positioned under the first stop shoulder, with an inside portion of the mount part being rounded to surround a part of the first joint unit;

an insert part integrally extending from an upper end of the mount part and rounded to have a same curvature as the inside portion of the mount part, the insert part being inserted into the second stop shoulder when the second joint unit rotates relative to the first joint unit;

an insert blade inwardly projected from horizontal center lines of inside portions of both the mount part and the insert part, the insert blade being circumferentially inserted into an outer circumferential surface of the first joint unit;

a mount hole provided at a predetermined portion of the first joint unit to be disposed under the first stop shoulder; and

a mount rod provided at a predetermined position of the mount part to be fitted into the mount hole.

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